Claims:

1. A method comprising:

subjecting particles of a sample to a dielectrophoretic force using a swept frequency signal in combination with a fixed frequency signal;

segregating the particles into two or more zones of a surface; and

attaching the particles to the surface.

2. The method of claim 1, where the swept frequency signal falls from a maximum intensity to a minimum intensity along a length of a surface in a first direction, and the fixed frequency signal falls from a maximum intensity to a minimum intensity along the length of the surface in a second direction opposing the first direction.

3. The method of claim 2, where the intensities vary linearly along the length of the surface.

4. The method of claim 2, where the intensities vary non-linearly along the length of the surface.

5. The method of claim 2, where the intensities are varied by varying a width of electrode buses with distance along a length of the surface.

6. The method of claim 2, where the minimum intensity of the swept frequency or fixed frequency signal is non-zero.

7. The method of claim 1, further comprising filtering the sample by subjecting particles of the sample to a flow, a cross flow, and a dielectrophoretic force that opposes a force associated with the cross flow.

8. The method of claim 7, where the flow and cross flow are substantially perpendicular to one another.

9. The method of claim 7, where the flow and cross flow are not perpendicular.

10. The method of claim 7, where the dielectrophoretic force arises from the excitation of electrodes near a dielectric substrate having openings.

11. The method of claim 7, where the dielectrophoretic force arises from current passing through an opening in a dielectric barrier.

12. The method of claim 1, where attaching the particles into two or more zones comprises use of a physical barrier to confine particles in a particular zone.

13. The method of claim 1, where segregating the particles comprises flow DEP-FFF.

14. The method of claim 1, further comprising promoting growth of particles on the surface.

15. The method of claim 1, further comprising automatically adjusting the swept frequency signal or fixed frequency signal as a function of conductivity of a particle suspending medium.

16. A method comprising:

subjecting particles of a sample to a dielectrophoretic force to segregate the particles into two or more zones of a surface;

attaching the particles to the surface, thereby defining a segregated smear; and

fixing or staining the segregated smear.

17. The method of claim 16, comprising fixing and staining the segregated smear.

18. The method of claim 16, the attaching comprising subjecting the particles to a dielectrophoretic force.

19. The method of claim 16, the attaching comprising using an adhesive coupled to the surface.

20. The method of claim 16, the attaching comprising allowing the particle to settle on the surface.

21. The method of claim 16, the particles comprising cells.

22. The method of claim 16, the smear comprising a pap smear.

23. The method of claim 16, where subjecting particles to a dielectrophoretic force comprises subjecting the particles to a dielectrophoretic force arising from the simultaneous application of programmed voltage signals of different frequencies.

24. The method of claim 16, where subjecting particles to a dielectrophoretic force comprises subjecting the particles to a dielectrophoretic force arising from the application of frequencies exhibiting one or more DEP-FFF and trapping phases.

25. The method of claim 16, where subjecting particles to a dielectrophoretic force comprises subjecting the particles to dielectrophoretic forces generated by electrodes coupled to the surface.

26. The method of claim 25, the electrodes comprising spiral electrodes.

27. The method of claim 16, the two or more zones comprising concentric circular zones.

28. The method of claim 16, the two or more zones comprising distinct bands of particles.

29. The method of claim 16, where subjecting particles of the sample to a dielectrophoretic force comprises using a swept frequency signal in combination with a fixed frequency signal.

30. The method of claim 29, where the swept frequency signal falls from a maximum intensity to a minimum intensity along a length of a surface in a first direction, and the fixed frequency signal falls from a maximum intensity to a minimum intensity along the length of the surface in a second direction opposing the first direction.

31. The method of claim 30, where the intensities vary linearly along the length of the surface.

32. The method of claim 30, where the intensities vary non-linearly along the length of the surface.

33. The method of claim 30, where the intensities are varied by varying a width of electrode buses with distance along a length of the surface.

34. The method of claim 30, where the minimum intensities of the swept frequency and fixed frequency signals are non-zero.

35. The method of claim 29, further comprising automatically adjusting the swept frequency signal or fixed frequency signal as a function of conductivity of a particle suspending medium.

36. The method of claim 16, further comprising filtering the sample by subjecting particles of the sample to a flow, a cross flow, and a dielectrophoretic force that opposes a force associated with the cross flow.

37. The method of claim 36, where the flow and cross flow are substantially perpendicular to one another.

38. The method of claim 36, where the flow and cross flow are not perpendicular.

39. The method of claim 36, where the dielectrophoretic force arises from the excitation of electrodes near a dielectric substrate having openings.

40. The method of claim 36, where the dielectrophoretic force arises from current passing through an opening in a dielectric barrier.

41. The method of claim 36, where attaching the particles into two or more zones comprises use of a physical barrier to confine particles in a particular zone.

42. The method of claim 16, where particles are segregated using flow DEP-FFF.

43. The method of claim 16, further comprising promoting growth of particles on the surface.

44. An apparatus comprising:

a surface;

electrodes near the surface;

a first signal generator configured to apply a fixed frequency signal to an electrode, the fixed frequency signal falling from a maximum intensity to a minimum intensity along a length of the surface in a first direction;

a second signal generator configured to apply a swept frequency signal to an electrode, the swept frequency signal falling from a maximum intensity to a minimum intensity along the length of the surface in a second direction opposing the first direction; and

where applying the swept frequency signal in combination with the fixed frequency signal generates a dielectrophoretic force configured to segregate particles into two or more zones of the surface.

45. The apparatus of claim 44, where the first and second signal generators are integral.

46. The apparatus of claim 44, further comprising a filter coupled to the surface, the filter configured to subject particles of a sample to a flow, a cross flow, and a dielectrophoretic force that opposes a force associated with the cross flow.

47. The apparatus of claim 46, the filter comprising electrodes near a dielectric substrate having openings.

48. The apparatus of claim 44, further comprising a physical barrier near the surface configured to attach particles into two or more zones of the surface.

49. An apparatus for preparing a smear for cytopathology, comprising:

a dielectrophoretic field flow fractionator configured to subject particles of a sample to a dielectrophoretic force to segregate the particles into two or more zones; and

a dielectrophoretic collector coupled to the fractionator configured to subject the particles to a dielectrophoretic force to attach the particles to a surface.

50. The apparatus of claim 49, the smear comprising a pap smear.

51. The apparatus of claim 49, where the fractionator and collector form an integral unit.

52. The apparatus of claim 49, further comprising a machine reader coupled to the fractionator or collector and configured to evaluate particles within the two or more zones.

53. The apparatus of claim 49, further comprising a fixing stage and a staining stage coupled to the collector.

54. The apparatus of claim 53, where the fixing and staining stages are coupled to the collector to form an integral unit.

55. A kit in a suitable container for preparing a smear for cytopathology, comprising:

a surface comprising an array of electrodes adapted to subject particles of a sample to a dielectrophoretic force to segregate the particles into two or more zones;

one or more fixing agents; and

one or more staining agents.

56. The kit of claim 55, the one or more staining agents comprising one or more pap smear stains.